

**FACT SHEET FOR NPDES
PERMIT NO. WA-000297-6**

KB ALLOYS, INC.

GENERAL INFORMATION	
Applicant:	KB Alloys, Inc.
Facility Address:	4400 Kawecki Road Malaga, WA 98828
Type of Facility:	Aluminum Master Alloys Foundry
SIC Code:	3355
Discharge Location:	Latitude: 47° 22' 07" N. Longitude: 120° 10' 48" W.
Water Body Name and ID Number	Waterbody Name: Columbia River Waterbody ID Number: WA-CR-1040

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington (State) on the basis of Chapter 90.48 RCW which defines the Department of Ecology's (Department) authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing/reissuing permits (Chapter 173-220 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be reissued before discharge of wastewater to waters of the State is continued. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the proposed permit. One of the requirements (WAC 173-220-060) for reissuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the proposed permit is reissued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the proposed permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the proposed permit will be summarized in Appendix C -- Response to Comments.

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

The KB Alloys, Inc. Wenatchee plant is located on the south side of the Columbia River, approximately seven miles southeast of Wenatchee, and one-half mile east of Malaga, Washington. The plant has been operating since 1967, producing aluminum-based master alloys for sale in international markets. Master alloys are solid solutions of certain metals such as manganese and titanium in aluminum. These alloys are used by primary aluminum refiners to adjust the compositions of their aluminum products.

The facility contains three production lines: two ingot casting lines and a rod casting line. Presently, only the rod casting line is operating. The company has temporarily discontinued operating the ingot casting lines until the market for this product becomes more financially profitable.

The Permittee has requested that the conditions of this permit be structured as if all production lines are operating so that the permitting process will not have to be repeated unnecessarily. The Department agrees to this request. Consequently, this fact sheet describes the facility as if it were operating at full production capacity, and the conditions of the accompanying permit were determined with the assumption that full production will resume in the near future.

Industrial Process

This facility manufactures aluminum master alloys. Master alloys are metal mixtures that can be added in specific amounts to other common molten metals to produce exact finished alloys. Aluminum, either in the molten state (brought in by truck from the nearby Alcoa Aluminum mill) or as ingots is the primary raw material. This is combined with salts of other metals, primarily titanium and boron, to produce the master alloys. The alloys are made either as ingots, or as continuous rods.

When casts are made, the molten alloy is poured into molds that are on a continuous conveyer. Water is sprayed first on the bottom of the mold and then on the casting itself to hasten cooling. The high temperature solidified casting is removed from the mold which is again heated in preparation for receiving the next pouring. The entire process occurs on a conveyer line system, with the molds in continuous movement. There are two casting machines in use at KB Alloys, one large and one small casting machine. Water is used and wastewater generated via the direct contact cooling of the molds and casts.

When rod is made, the molten aluminum alloy is formed into a continuous bar (approximately 1.5 inches in diameter) and water is sprayed directly onto the bar for partial cooling. The direct contact cooling water in this bar forming operation is drained off prior to any further oil

emulsion working and cooling. The bar is then fed into a machine which forms it into a continuous rod (approximately 3/8 inch in diameter). This forming of the rod and additional cooling of the rod is aided by application of a water based oil emulsion. Water is used (and wastewater is generated) via the direct contact cooling of the bar. This direct contact cooling water would be expected to contain the same contaminants as the water used to direct chill the molded ingots of aluminum alloy.

Oil used to form and cool the rod is isolated in an enclosed system and is disposed of via recycling when necessary. Roughly once every three months about 3,000 gallons or less of spent oil emulsion is pumped out of the holding tank by Harbor Oil of Spokane, Washington.

Water Use and Wastewater Generation

KB Alloys obtains all of its water from two wells located on its property. A Certificate for Water Right, Number 5759-A, issued July 28, 1967 to Kawecky Berylco Industries (the former name of this facility) is on file with the Department of Ecology. This certificate was amended in 1982 by Certificate of Change recorded in Vol. 1-4, Page 201. The certificate, as amended, authorizes 310 acre-feet of water per year (276,792 gallons per day) for continuous industrial supply, and 10 acre-feet per year (8929 gallons per day) for continuous domestic supply. The locations of the wells are specified on the certificate as being 700 feet east and 300 feet south of the center of section 27 and 318 feet south of the center of Section 27, Township 22 North, Range 21 E.W.M., in Chelan County.

The main use of water within the facility is for the rod forming machine, which uses approximately 100,000 gallons of water per day for contact cooling. None of the water used for direct contact cooling is recycled, but roughly 6,000 gpd is lost to evaporation. All of the waste contact cooling water is collected within the plant and routed via drains to the monitoring station, and then via the outfall, to the Columbia River. No treatment of this wastewater is provided prior to discharge. The maximum discharge of wastewater directly to the Columbia River on a daily basis is 300,000 gallons when all production lines are operating (See Table of Water Use below).

In 1985 the company investigated the possibility of water recycling within the plant, with an eye toward reducing or eliminating the discharge to the Columbia River. The study concluded that recycling was undesirable because of the buildup of contaminants in the cooling water as well as the costs involved with recycling. The one exception to this was the ion exchange unit backwash. The recycle study concluded that the discharge of this wastewater could be eliminated via redirection and use as makeup water for the wet fume scrubber. This has since been done.

In 1989 KB Alloys made a major investment in modernizing its furnace cooling system with one goal being water conservation. When this modernization was completed in the summer of 1990,

it allowed an effluent flow reduction of well over 40,000 gallons per day. This reduction was achieved through the use of a close loop system. The reduced flow of water passing out of this closed loop system was significantly warmer than the discharge addressed in the last permit. A lower flow of water with an incremental temperature increase can, and in this case does, carry less heat than a larger cooling flow. Once mixed with a large dilution flow in the Columbia River the final temperature in the dilution zone will be lower if the total heat content of the cooling water is reduced. Unfortunately, as the closed loop system stores heat, it occasionally (about once a week or less frequently) exceeds the maximum instantaneous discharge temperature. To cool these high temperature excursions requires the addition of more cool water. This necessitates an occasional high discharge flow. The Department wishes to encourage the full use of this closed loop system. While an increase in the discharge temperature must be arranged over a longer period of time, an increase in flow that will allow dilution of occasional high temperatures in the closed loop waters shall be granted in this permit cycle. Plant water use is as detailed in the following "Table of Water Use", other water uses include; compressor cooling, electrical equipment cooling, wet fume scrubber, plant laboratory, and sanitary uses. Water used for the air compressors is now discharged directly to the Columbia River.

Some of the water used in the wet fume scrubber is lost via evaporation (6,000 gallons per day), with the remainder (200 gallons per day) incorporated into the solids being generated by the scrubber. Under ordinary conditions all of the water used in the cation exchange unit and for cooling plant electrical equipment (5,000 gallons per day) is lost via evaporation, with the remainder (5,000 gallons per day) being evaporated in the Wet Fume Scrubber and (1,000 gallons per day of use) in the Rod Casting Machine. Of the total volume of waters used for contact cooling of the alloys (255,200 gallons per day), and estimated 6,000 gallons per day is lost via evaporation, with the remainder (240,000 gallons per day) being discharged to the Columbia River.

Wastewater Discharges

The facility discharges process wastewaters generated by production lines and some storm waters (from roof drains) to the Columbia River, laboratory and sanitary wastewaters to an onsite drainfield, and the remaining storm water to a roadside percolation ditch on the property.

Discharge to Surface Water

All of the process wastewaters, which are contact cooling waters from the casting lines, are combined and routed through a flow measuring and water quality sampling station prior to discharge to the Columbia River. No treatment of this waste stream is provided prior to discharge. Also routed through the flow measuring and sampling station are some of the roof drains. All raw materials and final products are located in covered areas protected from contact with stormwaters, with the exception of solid aluminum ingots (a raw material). These ingots

are stored on a concrete pad with drainage from this pad into a gravel area on site. No direct discharge to the Columbia River from this area can occur.

Discharges to Ground

The Administrative Building contains the facility offices, meeting rooms, lunch room and the quality control laboratory. The laboratory is used to assure that alloys produced at the plant contain the specific concentrations of metals requested by the customer. Wastewater generated by the laboratory is discharged down a sink drain, through a small neutralization bed mounted on the drainpipe, and then into a 500-gallon underground dilution tank to the north of the building. Wastewater is then piped to one of two 1,000 gallon septic tanks where it commingles with the building's sanitary wastewater. The combined wastestream is then piped approximately 80 feet to a distribution box and the drainfield. The drainfield receives approximately 500 gpd of laboratory wastewater and 2,000 gpd of sanitary wastewater.

A limited study of the impacts of the discharge on drainfield soils and ground water was conducted in November 1989 by Dames and Moore. Briefly, the study concluded that,

Except for the dilution tank, samples collected for this investigation demonstrated generally insignificant concentrations of contaminants. Even in the dilution tank, the degree of contamination is fairly minimal. Arsenic, chromium, and copper were measured in concentrations slightly above drinking water standards. Of the volatile hydrocarbons, only methanol was measured in greater than ppb concentrations. (*Characterization of Soils Surrounding the Administrative Building Drain Field, KB Alloys, Inc. Wenatchee Plant*, dated March 6, 1990, p.14.)

Discharges to the drainfield and the Permittee's drain field report are further addressed in this fact sheet in the section *HYDROGEOLOGIC STUDY*, p. 24.

One set of storm drains, located between the wet fume scrubber and the main manufacturing building, drains into a roadside ditch within the plant area. As much of this area is covered, stormwater generation in this area is small and does not result in a discharge to the Columbia River. The facility's storm water discharge is covered under Storm Water Permit No. SO3-002453 and will not be discussed further in this fact sheet.

The wet fume scrubber system is a rather large area surrounded by roughly 6 inch concrete dikes. All leakage of waters from this system, as well as stormwater falling within the dikes, is collected in a pumped sump and recycled into the wet fume scrubber system. Water used in this process is either eliminated via evaporation or is incorporated into the filter press cake generated by the scrubber system. The wet fume scrubber water reservoir liquid level control systems, coupled with the relatively high demand for scrubber water, would tend to make any accidental

spill highly unlikely. A discharge from the scrubber system would gravity flow to the nearby roadside stormwater percolation ditch.

PERMIT STATUS

The previous permit for this facility was issued on October 20, 1995. The previous permit placed effluent limitations on the following parameters: Flow, Temperature, pH, Total Suspended Solids (TSS), Oil and Grease, Fluoride, Boron, Aluminum, Chromium, Copper, and Zinc.

An application for permit renewal was received by the Department on July 15, 1999 and accepted by the Department on July 19, 1999.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

A compliance inspection without sampling was conducted on July 26, 1999.

During the history of the previous permit, the Permittee has remained in compliance based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department.

WASTEWATER CHARACTERIZATION

The Permittee's contact cooling water discharge to the Columbia River is characterized in the table below for the 1993 and 1998 calendar years. The wastewater characterization for 1993 is included to reflect the last year the Permittee operated all three casting lines.

Mass loading effluent limitations during the 1990-1995 permit cycle remained unchanged during the 1995-2000 permit cycle, except for flow, cyanide, and the average monthly limit for oil and grease. The flow limits were raised in the latter permit, from .25 to .3 million gallons per day (MGD), for unexplained reasons.

The cyanide limits were dropped from the most recent permit. Although the regulation allows a greatly reduced monitoring frequency of at least once per year, the effluent limit should have been retained in the event annual monitoring revealed the presence of cyanide. (See fact section **PERMIT LIMITATIONS** for further discussion concerning effluent limits for cyanide in this permit.)

The mass loading average monthly limit for oil and grease increased from 2.04 lbs/day in the earlier permit to 2.63 lbs/day in the latter permit. No explanation for this action was given.

All values in the table are in pounds per day (lbs/day) except as otherwise indicated. The wastewater discharge is characterized for the following regulated parameters:

Wastewater Characterization

Parameter	Effluent Limitations		1993 Characterization		1998 Characterization	
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum
Flow, in MGD	0.30	0.30	0.12	0.23	0.13	0.16
TSS	4.28	9.00	0.53	2.2	1.24	1.55
O & G	2.63	4.39	0.86	1.89	0.77	2.13
Temperature, in °C	NA ¹	27.0 ² 44.5 ³	19.2	32.2	22.0	35.1
Fluoride	NA ⁴	7.00	0.53	1.10	0.61	0.97
Boron	2.18	5.20	0.39	0.75	0.14	0.29
Aluminum	0.704	1.41	0.11	0.31	0.20	0.35
Chromium	0.04	0.10	0.003	0.01	0.01	0.01
Copper	0.04	0.094	0.002	0.013	0.00	0.00
Zinc	0.134	0.321	0.022	0.052	0.027	0.036

1-No average monthly limit specified for temperature.

2-Maximum average limit throughout the day.

3-Instantaneous limit.

4-No average monthly limit specified for fluoride.

PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in an NPDES permit must be either technology- or water quality-based. Technology-based limitations are based upon the treatment methods available to treat specific pollutants. Technology-based limitations are set by regulation or developed on a case-by-case basis (40 CFR 125.3, and Chapter 173-220 WAC). Water quality-based limitations are based upon compliance with the Water Quality Standards for Surface Waters (Chapter 173-201A WAC), Water Quality Standards for Ground Waters (Chapter 173-200 WAC), Sediment Management Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992). Each of these types of limits is described in more detail below, with the more stringent being chosen for each of the parameters of concern.

The limits in this permit are based in part on information received in the permit application. The effluent constituents detailed in the application were evaluated on a technology- and water-quality basis, and the applicable limits necessary to meet the rules and regulations of the State were then determined and placed into this permit. The Department does not need to develop effluent limits for all of the effluent pollutants reported in the proposed permit's application, because some pollutants don't have a reasonable potential to cause a water quality violation. If

significant changes occur in any pollutant (constituent), as described in 40 CFR 122.42(a), the Permittee is required to notify the Department, as soon as possible.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

A. Applicable Effluent Guidelines (Technology Based)

This facility does not clearly fall under the definition of any process for which BPCT and BAT federal effluent guidelines have been promulgated. Four different federal guidelines were studied in an attempt to determine their applicability to the KB Alloys' effluent discharge situation. The CFR parts reviewed are as follows:

- a. Part 421; Non Ferrous Metals Manufacturing Point Source Category; Subpart C - Secondary Aluminum Smelting Subcategory;
- b. Part 464; Metal Molding and Casting Point Source Category; Subpart A - Aluminum Casting Subcategory;
- c. Part 467; Aluminum Forming Point Source Category; Subpart B - Rolling With Emulsions Subcategory; and
- d. Part 471; Non Ferrous Metals Manufacturing Point Source Category; Subpart C.

The applicability of these effluent guidelines are discussed below.

- a. Part 421.1 and 421.3

Neither of the process definitions, under 421.1 and 421.3, properly fit the KB Alloys' situation. Although metallic aluminum alloys are manufactured at this facility, they are not made from aluminum scrap. Ingots and pigs of aluminum alloys are poured from molten aluminum, but aluminum salts are not reduced to aluminum metal. As a result, this section of the federal register will not be further considered in determining applicable effluent guidelines.

- b. Part 464; Metal Molding and Casting Point Source Category; Subpart A - Aluminum Casting Subcategory.

Under Part 464.02, the Federal Register states as follows:

- (a) Aluminum Casting. The remelting of aluminum or an aluminum alloy to form a cast intermediate or final product by pouring or forcing the molten metal into a mold, except for ingots, pigs, or other cast shapes related to

non-ferrous (primary and secondary) metals manufacturing (40 CFR Part 421) and aluminum forming (40 CFR Part 467).

Effluent limits under Part 464 were considered for Cast Quenching and Mold Cooling. Initial analysis indicated roughly equal environmental protection under a mixed Part 464/Part 467 set of derived limits. Finally as a result of the warning above, that reads: "...except for ingots, pigs, or other cast shapes related to non-ferrous (primary and secondary) metals manufacturing (40 CFR Part 421 and aluminum forming (40 CFR Part 467).", the Part 467 guidelines were selected.

c. Part 467; Aluminum Forming Point Source Category; subpart B - Rolling With Emulsions Subcategory.

Under the general definitions section (Part 467.02) of the Aluminum Forming Point source Category, the following definitions are made applicable to this part:

- (a) Aluminum forming is a set of manufacturing operations in which aluminum and aluminum alloys are made into semifinished products by hot or cold working;
- (c) Contact cooling water is any wastewater which contacts the aluminum workpiece or the raw materials used in forming aluminum;
- (d) Continuous casting is the production of sheet, rod, or other long shapes by solidifying the metal while it is being poured through an open ended mold using little or no contact cooling water. Continuous casting of rod and sheet generates spent lubricants and rod casting also generates contact cooling water;
- (g) Drawing is the process of pulling metal through a die or succession of dies to reduce the metal's diameter or alter its shape. There are two aluminum forming subcategories based on the drawing process. In the drawing with emulsions or soaps sub-category the drawing process uses an emulsion or soap solution as a lubricant;
- (n) Neat oil is a pure oil with no or few impurities added. In aluminum forming, its use is mostly as a lubricant;
- (o) Rolling is the reduction in thickness or diameter of a workpiece by passing it between lubricated steel rollers. There are two subcategories based on the rolling process. In the rolling with neat oils subcategory, pure or neat oils are used as lubricants for the rolling process.

BPCT (Best Practical Control Technology) effluent limits for rolling with Emulsions Subcategory - Direct Chill Casting Contact Cooling Water are as follows:

Direct Chill Casting Contact Cooling Water

<u>Parameter</u>	<u>Daily Maximum</u>	<u>Monthly Average</u>
Chromium	0.59 mg/off-kg	0.24 mg/off-kg
Cyanide	0.39 mg/off-kg	0.16 mg/off-kg
Zinc	1.94 mg/off-kg	0.81 mg/off-kg
Aluminum	8.55 mg/off-kg	4.26 mg/off-kg
Oil & Grease	26.58 mg/off-kg	15.95 mg/off-kg
Suspended Solids	54.49 mg/off-kg	25.92 mg/off-kg

All above values are expressed as mg/off-kg (lbs/million off-lbs) of aluminum cast, where; off-kilograms or off pounds means the mass of aluminum or aluminum alloy removed from a forming or ancillary operation at the end of a process cycle for transfer to a different machine or process.

BAT (Best Available Technology) effluent limits for Direct Chill Casting are identical to the BPCT limits except for the elimination of the conventional parameters (Oil & Grease, Suspended solids and pH). There seems to be little reason to expect the ingot casting Direct Chill Casting Contact Cooling Water to be different from the rod casting contact cooling water. The oil emulsion is not used until after the waste contact cooling water has been completely removed from the rod. The lack of copper and lead limits in the Part 467 Direct Chill Casting BPCT limits will require a Best Professional Judgment limitation for copper. No limitation of lead is deemed necessary, because KB Alloys makes no alloys containing lead.

B. Choice of Guidelines and Other Factors Employed to Determine Effluent Limits

Based on the discussion presented in Part A of this section (Applicable Effluent Guidelines) and a study of the development documents, it appears that BPCT effluent limits specified in Part 467 subpart B-Rolling With Emulsions Subcategory-Direct Chill Casting Contact Cooling Water are applicable to the entire direct contact wastewater stream from KB Alloys. These limitations have been assumed to include the extended pH limitation from pH 6 to 10 as explained in the footnotes to the BPCT tables above.

EXPIRATION DATE: JUNE 30, 2010

Calculations of metals toxicity have been performed with the aid of the Water Quality Criteria & Effluent Calculations spreadsheet (Greg Bohn 1993). All these metals are well below toxic levels prior to discharge from the KB Alloys facility.

Applying the production based guideline values to the KB Alloys Wenatchee Plant, the following discharge limitations in pounds per day (lbs/day) may be calculated:

<u>Parameter</u>	<u>Daily Maximum</u>	<u>Monthly Average</u>
Zinc	0.321 lbs/day	0.134 lbs/day
Chromium	0.098 lbs/day	0.040 lbs/day
Cyanide	0.064 lbs/day	0.026 lbs/day
Aluminum	1.41 lbs/day	0.704 lbs/day
Oil & Grease	4.39 lbs/day	2.636 lbs/day
Suspend Solids	9.00 lbs/day	4.28 lbs/day
pH	within the range 7.0 to 10.0, to be expanded by the Federal Water Quality Standards of pH within the range 6.5 to 8.5 with a man caused variation no greater than 0.5 units. The final limitations will be 6.0 to 10.0.	

A sample calculation for the zinc Daily Maximum Limitation is as follows:

$$(1.94 \text{ lbs/million lbs}) \times .16524 \text{ million off-lbs/day} = 0.321 \text{ lbs.}$$

Using a maximum discharge flow of 300,000 gallons per day and the above listed limitations (in pounds per day), the following concentration limitations may be calculated:

<u>Parameter</u>	<u>Daily Maximum</u>	<u>Monthly Average</u>
Zinc	128.00 µg/l	64.19 µg/l
Chromium	46.80 µg/l	19.02 µg/l
Cyanide	23.97 µg/l	10.39 µg/l
Aluminum	677.60 µg/l	337.60 µg/l
Oil & Grease	2,106.50 µg/l	1,264.10 µg/l
Susp. Solids	4,318.50 µg/l	2,054.20 µg/l

A sample of the concentration limit calculation for zinc is as follows:

$$0.32057 \text{ lbs/300,000 gals} \times 1 \text{ gals/3.785 liters} \times$$

$$453.59 \times 10^6 \text{ µg/ lbs.} = 128.06 \text{ µg/liter}$$

These are the effluent limitations that shall be specified in the permit. Fluoride has been reviewed for its possible effect on human health and the fluoride limitation is well below the Federal Primary Drinking Water Standard of 4.0 mg/L total fluoride as (F-).

The BPCT Federal effluent limitations under Part 467 come with an exception outlined in paragraph 467.03 (a) Monitoring and Reporting Requirements. This section reads:

"The following special monitoring and reporting requirements apply to all facilities controlled by this regulation.

- (a) Periodic analyses for cyanide as may be required under Part 122 or 403 of this chapter are not required when both of the following conditions are met:
 - (1) The first wastewater sample of each calendar year has been analyzed and found to contain less than 0.07 mg/L cyanide.
 - (2) The owner or operator of the aluminum forming plant certifies in writing to the ... permit issuing authority that cyanide is not and will not be used in the aluminum forming process.

A certification similar to, and in addendum to the cyanide certification called for in Part 467.03 shall be used to control any lead discharged in the wastewater from KB Alloys. At present KB Alloys is not producing any aluminum alloys containing lead due to industrial hygiene regulation on the plant. A certification that no lead or cyanide will be used at the plant, and data to demonstrate that the lead concentration is significantly below 11.27 µg/L and the cyanide concentration is significantly below 70 µg/L, should limit the need for testing. In March and April of 1990 testing for lead and cyanide at the plant was completed as a part of the special plant effluent study outlined in OTHER REPORTS AND STUDIES below. By May of 1990 data had been submitted to the Department of Ecology demonstrating that lead and cyanide were not detectable at part per billion levels in the KB Alloys discharge, further cyanide testing has been done in 1991, 1992, 1993, and 1994.

The calculated technology-based effluent limits for cyanide, in terms of concentration and assuming a flow of 300,000 gpd, are 23.97 µg/L (daily maximum) and 10.39 µg/L (monthly average). Annual testing for cyanide, conducted in March 1993, February 1994 and January 1995, revealed no detections to the method detection level of 10 µg/L. No analysis for cyanide has been conducted since January 1995. The calculated effluent limits are much lower than the level of 70 µg/L set by the above-mentioned monitoring exemption. Therefore, this permit requires annual testing to the 10 µg/L level. In the event cyanide is detected at the 10 µg/L level,

the Permittee must notify the Department in writing of this occurrence and begin monthly testing for this parameter.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

The State's Water Quality Standards for Surface Waters (Chapter 173-201A WAC) stipulate that waste discharge permits shall be conditioned such that the discharge will protect existing water quality and preserve the designated beneficial uses of the State's surface waters, WAC 173-201A-060. Surface water quality-based effluent limitations may be based either on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading (TMDL) study.

Numerical Criteria for the Protection of Aquatic Life

"Numerical" water quality-based criteria are numerical values set forth in the State's Water Quality Standards for Surface Waters. They specify the maximum levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria are used along with the chemical and physical data of the wastewater and receiving water in order to derive the applicable effluent limits for the proposed permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, the water quality-based limitations must be used in the proposed permit.

Numerical Criteria for the Protection of Human Health

The EPA has promulgated 91 numerical water quality-based criteria for the protection of human health that are applicable to the State (EPA 1992). These criteria are designed to protect humans from cancer and other disease, and are primarily applicable to fish/shellfish consumption and drinking water from surface waters.

The pollutants of concern in the Permittee's discharge that are subject to the human health criteria are copper, zinc and chromium. The EPA has established numerical human health criteria for copper and zinc, which were inserted into the Department's standard spreadsheet to determine the potential to exceed the human health water quality-based criteria. Due to the very large dilution factor that occurs after discharge there was no potential to exceed the human health criteria for these metals. The spreadsheet used to make this determination can be found in Appendix D of this fact sheet.

The EPA has not yet established a numerical human health criterion for chromium. Should a criterion be established during the term of this permit, a reasonable potential determination will be conducted and appropriate action taken by the Department.

Narrative Criteria

In addition to numerical criteria, "narrative" water quality-based criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) surface waters in the State.

Antidegradation

The State's Antidegradation Policy requires that discharges to a receiving water shall not further degrade the existing natural water quality of the water body. In cases where the natural conditions of a receiving water are either of lower or higher quality than the criteria assigned, the natural conditions shall constitute the water quality-based criteria. More information concerning the State's Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if the natural ambient water quality is either higher or lower than the designated classification criteria given in the State's Water Quality Standards for Surface Waters. Therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by the proposed permit should not cause a loss of beneficial uses.

Critical Conditions

Surface water quality-based limitations are derived for the waterbody's "critical" conditions, which represent the receiving water conditions with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic waterbody uses. These conditions may not all necessarily occur together during the same period of time.

Mixing Zones

The State's Water Quality Standards for Surface Waters allow the Department to authorize mixing zones around a point of discharge in order to establish surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants of concern that can have a toxic effect on the aquatic environment near their point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving "all known, available, and reasonable methods of prevention, control and treatment" (AKART) and that are in compliance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows different chronic mixing zones to be used to meet human health criteria, depending on whether the pollutant of concern is either carcinogenic or not.

Monitoring data from 1990 to the present demonstrates that it is an extremely rare event when anything except the temperature of the discharge water at KB Alloys exceeds class A water quality standards. If the concentrations of these specific substances at the end of the KB Alloys discharge pipe is below these levels the KB Alloys cooling water can be discharged as if it were Class A water. Such calculations lead to the same conclusion reached by the toxicity tests carried out in the last permit cycle: With the exception of temperature the KB Alloys discharge meets class A water quality standards.

Description of the Receiving Water

Outfall #001 of the facility discharges to the Columbia River, which is designated as a Class A receiving water in the vicinity of the outfall. Other nearby point source outfalls include the City of Wenatchee and East Wenatchee Wastewater Treatment Plants, located approximately 10 miles upstream, and The Chinnet Company, Naumes Processing, and Tree Top-Wenatchee, located a further 5 miles upstream. Significant nearby non-point sources of pollutants include storm water runoff from agricultural areas, urban developments and roads. Characteristic uses of the receiving water include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation. Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

This segment of the Columbia River appears on the current 303(d) list as water quality-impaired by the Department for total dissolved gas and water column bioassay.

Surface Water Quality Criteria

Applicable criteria are defined in the State's Water Quality Standards for Surface Water for aquatic biota. Water Quality criteria for chromium, copper and zinc are hardness dependent and were determined using the CRITERIA.xls spreadsheet assuming a hardness of 55 mg/L. In addition, EPA has promulgated human health criteria for toxic pollutants (EPA 1992).

Criteria for this discharge are summarized below:

Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTU above background
Aluminum	Chronic: 87.0 µg/L; Acute: 750 µg/L
Chromium	Chronic: 109.1 µg/L; Acute: 336.3 µg/L
Copper	Chronic: 8.9 µg/L; Acute: 13.0 µg/L; Human Health: 1,300 µg/L
Zinc	Chronic: 82.3 µg/L; Acute: 90.1 µg/L; Human Health: 9,100 µg/L
Toxics	No toxics in toxic amounts

Consideration of Surface Water Quality-Based Limits for Numerical Criteria

Pollutant concentrations in the proposed discharge exceed, or have the potential to exceed, the applicable water quality criteria even with technology-based controls which the Department has determined to be AKART. A mixing zone for the permit's discharge is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants -- their adverse effects diminish rapidly with mixing in a receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs at some distance away from the discharge, even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which a pollutant of concern has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the ambient receiving water.

The critical condition flow for the Columbia River is the seven-day average low receiving water flow with a recurrence interval of ten years (7Q10). Ambient background critical condition data were taken from the fact sheet accompanying the previous permit and USGS data collected at its

Vernita Bridge monitoring station as part of its National Stream Water Quality Network, and include the following:

Parameter	Critical condition values used for calculating reasonable potential and final effluent limits.
7Q10 low flow	51,557 cfs
Velocity	0.98 ft/sec
Temperature	23° C
pH (high)	8.1
Turbidity	20 NTU
Hardness	55 mg/L as CaCO ₃
Aluminum	6.0 µg/L (dissolved median value)
Lead	1.0 µg/L (dissolved median value)
Copper	1.1 µg/L (dissolved median value)
Zinc	1.9 µg/L (dissolved median value)
Chromium	1.0 µg/L (dissolved median value)

The permit writer had some reluctance with using USGS data from the Vernita Bridge monitoring station, which is approximately 80 miles downstream of the Permittee's outfall. Data collected closer to the outfall would have been more desirable. However, the data was very recent collected (1996-1998) and is based on 25 sampling events, and was ultimately considered better than no data at all.

The USGS metals data is given as dissolved median values, but used as averages in the reasonable potential calculations. The differences between the median and average values were very slight and not considered significant. The median values for chromium and lead were actually below the detection level of 1 µg/L; however, due to the limitations of the software to calculate with "less than" values, 1 µg/L was used in reasonable potential calculations.

The dilution factors of effluent to receiving water that occur within these zones have been determined at critical conditions. The dilution factors have been determined to be :

	Acute Dilution Factor	Chronic Dilution Factor
Aquatic Life	467	1,479
Human Health, Non-carcinogen	N/A	1,479

The Department's Permit Writer's Manual allows the chronic dilution factor to be based on the 7Q10 condition of the river to be used when the 30Q5 is not known (p. VII-14).

The impacts of dissolved oxygen deficiency, temperature, pH, fecal coliform, chlorine, ammonia, metals, and other toxics were determined as shown below, using the dilution factors at critical conditions described above.

BOD₅ -- BOD is not a significant component of Permittee's discharge and, as such, computed BOD impacts were not significant and were not included in consideration of permit limits.

Temperature and pH -- The impact of pH and temperature were modeled using the calculations from EPA, 1988. The input variables were acute dilution factor 467, upstream temperature 12°C, upstream pH 8.0, upstream alkalinity 55 (as mg CaCO₃/L), maximum effluent temperature 35.1°C, lowest effluent pH of 5.8, highest effluent pH of 9.8, and effluent alkalinity 270 (as mg CaCO₃/L). The effluent temperature used was the highest ever reported, and the highest and lowest reported pH values, thereby resulting in worst case scenarios. The pHmix2 spreadsheet was utilized for the analyses. Printouts of the scenarios are presented in Appendix D.

Assuming an average ambient receiving water temperature of 12°C and the highest reported discharge temperature of 35.1°C, the predicted temperature at the edge of the mixing zone will be 12.05°C. The highest ambient temperature recorded by the USGS in recent years was 20.5°C. WAC 173-201A-030(2)c(iv) states: When natural conditions exceed 18.0°C, no temperature increases will be allowed which will raise the receiving water temperature by greater than 0.3°C. When the model was run with the ambient temperature of 20.5°C, the resulting temperature at the edge of the mixing zone was 20.53°C, within the maximum of 20.8°C. Therefore, there is no predicted violation of the water quality standards resulting from this discharge.

Assuming an ambient pH of 8.0 and an effluent pH of 5.8, predicted pH at the mixing zone edge will be 7.98, a decrease of 0.02 below ambient conditions. Assuming the same ambient pH and an effluent pH of 9.8, predicted pH at the edge of the mixing zone will be 8.0. Therefore, there is no predicted violation of the State's Water Quality Standards for Surface Waters. The pH limitations in the previous permit will be retained in this permit because impacts to the receiving water are almost immediately mitigated.

Toxic Pollutants -- Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals present in an effluent whenever there is a reasonable potential for those chemicals to exceed the numerical standards found in Chapter 173-201A WAC. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards or from having surface water quality-based effluent limits.

The following pollutants, in potentially toxic concentrations, were determined to be present in the discharge: aluminum, copper, chromium, and zinc. A reasonable potential analysis,

according to the EPA guidelines given in *Technical Support Document for Water Quality-based Toxics Control* (EPA/505/2-90-001), was conducted on these toxic parameters at critical conditions in order to determine whether or not effluent limitations for them would be required in this permit.

Earlier in this fact sheet, in the section titled CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERICAL CRITERIA, the use of ambient receiving water data collected by the USGS was discussed. Ambient background data was available for the metals present in the discharge that may be present in toxic concentrations. The reasonable potential determination using that background data resulted in no reasonable potential for this discharge to cause a violation of State's Water Quality Standards for Surface Water for the above-listed toxic pollutants. This determination assumes that the Permittee meets the other effluent limits contained in this permit. The Department's spreadsheet, REASPO.T.XLS, was used to make the reasonable potential determination. The spreadsheet is presented in Appendix D of this fact sheet.

Water quality criteria for metals as given in the Chapter 173-201A WAC are based on the dissolved fraction of the metals.

Metals criteria may also be adjusted, by the Department, using the water effects ratio approach established by EPA, as generally guided by the procedures in *EPA Water Quality Standards Handbook*, December 1983, as supplemented or replaced.

Whole Effluent Toxicity

Toxicity caused by unidentified toxic pollutants is not expected in the applicant's discharge when screened by the criteria given in the State's Whole Effluent Toxicity (WET) Testing and Limits (Chapter 173-205 WAC).

Federal regulations state:

Limits on whole effluent toxicity are not necessary where the permitting authority demonstrates . . . that chemical-specific limits for the effluent are sufficient to attain and maintain applicable numeric and narrative State water quality standards (40 CFR 122.44(d)).

In the best professional judgment (BPJ) of the permit writer, WET testing is not necessary for the following reasons:

- The discharge consists of contact cooling water passed across newly-cast rod (before the casting is treated with emulsions), and the contaminants in the wastewater are adequately addressed by the technology-based effluent limits;

- The Permittee's discharge has easily met the strict technology-based effluent limits of previous permits, both during times of full production and the present mode of reduced production (see *WASTEWATER CHARACTERIZATION*, p. 6);
- The levels of contaminants in the Permittee's discharge are small fractions of the calculated State water quality standards (see LIMIT.XLS spreadsheet in Appendix D); and
- The Permittee has been conscientious with taking precautions for preventing spills and isolating chemical storage areas from waters of the State;

Therefore, no WET testing will be required by this permit. The Department may, however, require WET testing if it receives future information indicating that toxicity has the potential to be present in the Permittee's final effluent or if production increases significantly.

Human Health

The State's Water Quality Standards now include 91 numerical health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the State by the EPA in its National Toxics Rule (*Federal Register*, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge is likely to contain chemical pollutants regulated for human health. The Permittee's discharge contains copper and zinc, the two constituents that have human health criteria. Furthermore, this segment of the receiving water is water quality-impaired for bioassay toxicity.

A reasonable potential determination of the applicant's discharge to cause an exceedance of the State's Water Quality Standards for Surface Waters was evaluated for copper and zinc, as required by 40 CFR 122.44(d), using the procedures given in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and the Department's *Permit Writer's Manual* (Ecology Publication 92-109, July, 1994). The determination indicated that the discharge has no reasonable potential to cause a violation of surface water quality standards, thus effluent limits based on human health are not warranted. The spreadsheet used to determine reasonable potential to exceed the human health criteria, HUMAN-H.XLS, is reproduced in Appendix D of this fact sheet.

Sediment Quality

The Department has promulgated Sediment Management Standards (Chapter 173-204 WAC) to protect aquatic biota and human health. Those standards stipulate that the Department may require dischargers to evaluate the potential for their wastewater to cause a violation of the Sediment Management Standards.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated the State's Water Quality Standards for Ground Waters (Chapter 173-200 WAC) to protect beneficial uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those water quality standards (WAC 173-200-100).

The Department believes the applicant's discharge has the potential to cause a violation of the State's Water Quality Standards for Ground Water. This permit does not, at this time, contain ground water effluent limitations or require ground water monitoring. However, the Permittee is also required to submit an engineering report to determine a regulatory acceptable method of treatment for the laboratory wastewater. Furthermore, Special Condition S1.C requires the Permittee to implement a program of best management practices (BMPs) to minimize generation of laboratory wastewater and potentially hazardous wastes.

COMPARISON OF EFFLUENT LIMITS WITH THE PREVIOUS PERMIT

The previous permit was issued on October 20, 1995, and contained effluent limits which are given in the following table as 'existing' limits. The following 'proposed' limits are those which the Department has determined to be appropriate for inclusion into this permit. Concentrations are provided in the table for context; the discharge is regulated in terms of mass loadings and effluent limits appear in the permit accordingly.

Parameter	Existing Limits		Proposed Limits	
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
Flow, in MGD	0.300	0.300	0.300	0.300
Total Suspended Solids, in lbs/day; mg/L	4.28 2.05	9.00 4.32	4.28 2.05	9.00 4.32
Oil & Grease, in lbs/day; mg/L	2.63 1.26	4.39 2.11	2.63 1.26	4.39 2.11
Fluoride, in lbs/day; mg/L	None Specified	7.00 10.0	None Specified	7.00 10.0
Boron, in lbs/day; mg/L	2.18 1.05	5.2 2.5	None Specified	None Specified
Aluminum, in lbs/day; mg/L	0.704 0.338	1.41 0.678	0.704 0.338	1.41 0.678

Parameter	Existing Limits		Proposed Limits	
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
Chromium, lbs/day; µg/L	0.04 19.02	0.10 46.8	0.04 19.02	0.10 46.8
Copper, lbs/day; µg/L	0.04 19.18	0.094 45.0	None Specified	None Specified
Zinc, lbs/day; µg/L	0.134 64.2	0.321 154.0	0.134 64.2	0.321 154.0
Temperature, in °C	27 Daily Average; 44.5 Instantaneous Maximum		27 Daily Average; 44.5 Instantaneous Maximum	
pH, in Standard Units	Between 6 and 10		Between 6 and 10	

Effluent limitations remain the same from the previous permit with the exception of boron and copper. There are no technology-based limits for these parameters. Furthermore, there was no potential to exceed either aquatic- or human health-based water quality standards.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in this permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of the applicant's discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

Monitoring for metals is required on a quarterly basis. Although the previous permit required monitoring on an annual basis, the Permittee routinely monitored on a monthly frequency, so there is a wealth of effluent data that demonstrates the high quality of the facility's discharge. Quarterly monitoring appears sufficient because of the Permittee's excellent record of compliance and the small quantities of contaminants in the discharge compared to effluent limits.

The previous permit improperly allowed the Permittee to subtract the amount of copper in the intake water from the amount discharged. However, Federal regulations only allow this practice when the source of the water supply and the waterbody being discharged to are the same. This is not the case at the KB Alloys facility: the facility receives its water supply from the aquifer and discharges to the Columbia River. This practice results in what is a naturally-occurring material

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in ground water becoming a contaminant when discharged to the Columbia River. Therefore, the Permittee will not be allowed to subtract copper in the water supply from that being discharged, but must report the actual amount of copper on discharge monitoring reports submitted to the Department.

This permit removes the requirement to analyze wastewater samples for boron; however, the requirement to analyze for copper remains. Effluent copper data is necessary to conduct reasonable potential determinations to exceed water quality standards in the future.

LAB ACCREDITATION

With the exception of certain parameters this permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The requirements of Special Condition S3. are based on the Department's authority to specify any appropriate reporting and recordkeeping requirements in order to prevent and control waste discharges to the waters of the State (WAC 273-220-210).

BEST MANAGEMENT PRACTICES

There exists the potential for the wastewaters that have been discharged from the onsite laboratory to contaminate septic tank sludge or degrade ground water quality. Special Condition S1.C requires the Permittee to develop and implement a program of best management practices (BMPs) to minimize generation of laboratory wastewaters that may degrade septic tank sludge or ground water quality. Information about laboratory BMPs is contained in the *Step-by-Step Guide to Better Laboratory Management Practices*, Ecology Publication 97-431, March, 1999. The Permittee may already have a system of BMPs already in place, but encourages the company to consult with the Department's Hazardous Waste & Toxics Reduction Program with any questions or concerns regarding laboratory practices.

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

The Permittee has developed a Spill Plan for preventing the accidental release of pollutants to State waters and for minimizing damages if a spill occurs. The facility has had only one

significant spill during the past ten years: 50 gallons of diesel fuel in 1998. The spill was contained and a proper cleanup conducted. An updated draft Spill Plan was received by the Department on December 7, 1999. The Permittee is required to submit the final Spill Plan by July 15, 2000.

The Permittee is required to submit updates to the Department as chemical handling or storage practices are modified, or when types or quantities of materials change. The Permittee is required to submit a revised Spill Plan to the Department with the application for permit renewal, or, in the event the chemical storage and handling procedures have not changed, a letter may be submitted to the Department stating so.

SOLID WASTE PLAN

The Department has determined that the Permittee has a potential to cause pollution of the waters of the State from leachate of solid waste.

This permit requires, under the authority of RCW 90.48.080, that the Permittee update its Solid Waste Plan which should be designed to prevent solid waste from causing pollution of the waters of the State. The plan is required to be submitted to the Department and to the local permitting agency, is required by local regulation.

OUTFALL EVALUATION

Special Condition S7. of this permit requires the Permittee to conduct an outfall inspection and submit an Outfall Evaluation Report detailing the findings of that inspection. The purpose of the inspection should be to determine the condition of the discharge pipe and diffuser(s), if any, and to evaluate the extent of sediment accumulations in the vicinity of the Permittee's outfall.

ENGINEERING REPORT

The Permittee has been discharging laboratory wastewater into an unpermitted onsite sewage system since as long ago as 1977. Laboratory wastewater is considered by the Department to be industrial wastewater. The Revised Code of Washington (RCW) clearly prohibits the disposal of untreated industrial wastewater to ground water (RCW 90.48.080). WAC 173-216-110(1)(a) requires the application of AKART to all discharges to ground. Dilution by sanitary wastewater is not considered treatment.

WAC 173-200-100(4)b states:

For reissued permits, the permit holder shall evaluate the impacts of its activities on ground water quality, and, if necessary to achieve compliance with ground water quality enforcement limits, determine a Department-approved schedule of compliance.

In 1989 the Permittee conducted a study to determine whether discharges from the drainfield had impacted soils and ground water. The study, *Characterization of Soils Surrounding the Administrative Building Drain Field, KB Alloys, Inc. Wenatchee Plant*, was briefly described in the WASTEWATER DISCHARGES section of this fact sheet, p. 6. In August 1999 the Department's Central Regional Office Hydrogeologist reviewed the study and found it does not meet current regulatory requirements for determining compliance with the State's Ground Water Quality Standards. Specific elements of the study that were called into question included:

- the number of samples taken were insufficient to characterize either background or downgradient ground water quality;
- dilution of wastewater discharges to ground is not acceptable AKART;
- mixing of domestic and industrial wastewaters may not be regulatory acceptable;
- concentrations of some wastewater constituents in the dilution tank were greater than Ground Water Quality criteria;
- concentrations of some constituents in the ground water samples were higher than in the background well; and
- it was not demonstrated that the "background" well are actually upgradient of the monitoring well and drainfield.

One sample was taken from the dilution tank, a total of four soil samples from two test pits dug in the drainfield, one sample from the plant's water supply well, and one sample from the monitoring well installed for the study.

The dilution tank sample was analyzed for 10 parameters. Results of the analysis and corresponding State Ground Water Quality criteria are presented in the table below:

Parameter	Concentration	Ground Water Standard
Ph	4.05	6.5-8.5
Total Arsenic, in µg/L	60	0.05
Total Chromium, in µg/L	2,200	100
Total Copper, in µg/L	131,000	1,000
Methanol, in µg/L	111.0	N/A
Benzene, in µg/L	29.0	5.0
Toluene, in µg/L	8.0	1,000
Ethylbenzene, in µg/L	63.0	700
Trichloroethene, in µg/L	10.0	N/A
Tetrachloroethene, in µg/L	5.0	N/A

N/A-Not applicable; no State Ground Water Quality criteria for these parameters.

As the table indicates pH, concentrations of arsenic, chromium, copper, benzene would have exceeded the current State Ground Water Quality Standards. Although wastewater discharged

from the dilution tank is further diluted when commingled with sanitary wastewater in the septic tanks, dilution is generally not considered an acceptable treatment method in this State.

This permit requires the development and submittal of an engineering report, for review and approval by the Department, that evaluates the environmental compliance of the present system of laboratory wastewater disposal in the context of the State's Ground Water Quality Standards and other relevant State environmental regulations. Specifically, the report must assess whether discharges from the drainfield to ground water are in compliance with the ground water quality standards. Also, the report must address whether metals and other pollutants that may be entrained in the septic tank sludge exceed applicable sludge standards. The report must also evaluate other methods of handling the facility's laboratory wastewater, such as discharge to the Columbia River and evaporation.

GENERAL CONDITIONS

General Conditions are based directly on State and Federal law and regulations and have been standardized for all individual industrial NPDES permits issued by the Department.

Condition G1. requires responsible officials or their designated representatives to sign submittals to the Department. Condition G2. requires the Permittee to allow the Department to access the treatment system, production facility, and records related to the proposed permit. Condition G3. specifies conditions for modifying, suspending or terminating the proposed permit. Condition G4. requires the Permittee to apply to the Department prior to increasing or varying the discharge from the levels stated in the proposed permit's application. Condition G5. requires the Permittee to construct, modify, and operate the permitted facility in accordance with approved engineering documents. Condition G6. prohibits the Permittee from using the proposed permit as a basis for violating any laws, statutes or regulations. Conditions G7. and G8. relate to renewal and transfer of the proposed permit. Condition G9. requires the Permittee to control its production in order to maintain compliance with its proposed permit. Condition G10. prohibits the reintroduction of removed substances back into the effluent. Condition G11. states that the Department will modify or revoke and reissue the proposed permit to conform to more stringent toxic effluent standards or prohibitions. Condition G12. incorporates by reference all other requirements of 40 CFR 122.41 and 122.42. Condition G13. notifies the Permittee that additional monitoring requirements may be established by the Department. Condition G14. requires the payment of permit fees. Condition G15. describes the penalties for violating conditions of the proposed permit.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify the proposed permit to impose numerical limitations, if necessary to meet the State's Water Quality Standards for Surface Waters, Sediment Management Standards, or Water Quality Standards for Ground Waters, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify the proposed permit as a result of new or amended State or Federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

The proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the State. The Department proposes that this permit be issued for five (5) years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. EPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. EPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The proposed permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on July 30, and August 6, 1999 in the Wenatchee World to inform the public that an application had been submitted and to invite comment on the reissuance) of the proposed permit.

The Department published a Public Notice of Draft (PNOD) on December 20, 1999 in the Wenatchee World to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator
Washington State Department of Ecology
Central Regional Office
15 West Yakima Avenue, Suite 200
Yakima, WA 98902

Any interested party may comment on the draft permit or request a public hearing on the draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in the draft permit will be mailed an individual notice of hearing (WAC 173-220-100).

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the proposed permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in the proposed permit.

Further information may be obtained from the Department by telephone, 509/575-2490, or by writing to the address listed above.

The proposed permit and fact sheet were written by Jim La Spina.

APPENDIX B--GLOSSARY

Acute Toxicity -- The lethal effect of a compound on a living organism that occurs within a short period of time, usually within 48 to 96 hours.

AKART -- An acronym used in State regulations which means "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality -- The existing environmental condition of the water in a receiving waterbody.

Ammonia -- Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also may increase the amount of chlorine needed to disinfect wastewater.

Best Management Practices (BMPs) -- Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅ -- Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent through the rate of utilization of oxygen by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen (DO) in a receiving water after effluent is discharged. Stress caused by reduced DO levels makes organisms less competitive and less able to sustain their species in the immediate aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass -- The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine -- Chlorine is used to disinfect wastewater of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity -- The effect of a compound on a living organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters for determining the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA) -- The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection -Without Sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its wastewater discharge permit or with applicable statutes and regulations.

Compliance Inspection -With Sampling -- A site visit to accomplish, at a minimum, the purpose of a Compliance Inspection - Without Sampling along with the addition of sampling and analysis for all parameters limited by a wastewater discharge permit in order to ascertain compliance with those limits, including all applicable percent removal requirements. Additional sampling may be conducted during the compliance inspection.

Composite Sample -- A mixture of individual grab samples collected at the same sampling point at different moments during a distinct period of time, typically 24-hours. The sample can be collected either by continuous sampling or by mixing discrete samples, and may be a "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity -- Clearing, grading, excavation or any other activity which disturbs the surface of the land. Such other activities include: road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Critical Condition -- The time of the year when the flow within the receiving water is low, typically at when 7Q10 would occur. At such time the ability of the receiving water to dilute effluent is significantly reduced and, therefore, waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. Other parameters are typically chosen at their 90th percentile during the same time of year as the 7Q10, or at their 95th percentile when collected year-round.

Daily Maximum Discharge Limitation -- The highest allowable Daily Discharge Value which the Permittee may discharge to the receiving water, without violating the issued NPDES permit.

Daily Discharge Value -- The average of the discharge measurements for an effluent pollutant parameter obtained over a single calendar day, or any 24-hour period that reasonably represents the calendar day for purposes of sampling. It is calculated as the sum of all discharge values measured during a calendar day, divided by the number of discharge values measured during that same calendar day.

Dilution Factor -- A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report -- A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater treatment facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria -- Fecal coliform bacteria are used as indicator organisms of pathogenic bacteria in the effluent which are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfection with chemicals such as chlorine or ozone. In a water body, the presence of high numbers of fecal coliform bacteria can indicate the recent release of untreated wastewater, a break-down of disinfection processes, and/or the presence of warm-blooded animal feces.

Grab Sample -- A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial Wastewater -- Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility -- A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Method Detection Level (MDL) -- The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero, and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone -- An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

Monthly Average Discharge Limitation -- The highest allowable Monthly Average Discharge Value which the Permittee may discharge into the receiving water, without violating the issued NPDES permit.

Monthly Average Discharge Value -- The average of the Daily Discharge Values for an effluent pollutant parameter obtained during a calendar month. It is calculated as the sum of all Daily Discharge Values measured during a calendar month, divided by the number of Daily Discharge Values measured during that same calendar month.

National Pollutant Discharge Elimination System (NPDES) -- The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. The State is one of many which have been delegated by EPA the authority to issue wastewater discharge permits. NPDES permits issued by State permit writers are joint NPDES/State permits issued under both State and Federal laws.

pH -- The pH of a liquid is a measure of its acidity or alkalinity. A pH of 7.0 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL) -- A calculated value typically equal to five times the MDL (method detection level).

State Waters -- Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the State.
Synonymous with “waters of the State”.

Storm water -- That portion of precipitation which does not naturally percolate into the ground or evaporate, but rather flows via overland passage, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit -- A permit limit on the concentration or mass of an effluent pollutant parameter which is based on the ability of a treatment method, or a set of treatment methods, to reduce the specific pollutant from the influent waste stream and thereby preventing its discharge into the receiving water.

Total Suspended Solids (TSS) -- Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset -- An exceptional incident in which there is unintentional and temporary noncompliance with permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit -- A permit limit on the concentration or mass of an effluent pollutant parameter that is intended to prevent that parameter from exceeding its water quality-based criterion after it is discharged into a receiving water.

APPENDIX C -- RESPONSE TO COMMENTS

No comments were received by the Department of Ecology.

APPENDIX D -- TECHNICAL CALCULATIONS

CALCULATION OF WATER QUALITY-BASED EFFLUENT LIMITS

Water quality-based effluent limits are calculated by the two-value wasteload allocation process as described on page 100 of the Technical Support Document (EPA, 1991) and shown below.

1. Calculate the acute wasteload allocation (WLA_a) by multiplying the acute criteria by the acute dilution factor and subtracting the background factor. Calculate the chronic wasteload allocation (WLA_c) by multiplying the chronic criteria by the chronic dilution factor and subtracting the background factor.

$$WLA_a = (\text{acute criteria} \times \text{acute zone dilution factor}) - (\text{background concentration} \times (\text{acute zone dilution factor} - 1))$$

$$WLA_c = (\text{chronic criteria} \times \text{chronic zone dilution factor}) - (\text{background concentration} \times (\text{chronic zone dilution factor} - 1))$$

2. Calculate the long term averages (LTA_a and LTA_c) which will comply with the wasteload allocations WLA_a and WLA_c , as follows:

$$LTA_a = WLA_a \times e^{[0.5 \sigma^2 - z \sigma]}$$

$$LTA_c = WLA_c \times e^{[0.5 \sigma_n^2 - z \sigma]}$$

where:

$$\sigma^2 = \ln[CV^2 + 1]$$

$$z = 2.326$$

$$CV = \text{coefficient of variation}$$

where:

$$\sigma_n^2 = \ln[(CV^2 - n) + 1]$$

$$z = 2.326$$

$$CV = \text{coefficient of variation}$$

3. Use the smallest LTA of the LTA_a or LTA_c to calculate the maximum daily limit (MDL) and the average monthly limit (AML), as follows:

$$MDL = LTA \times e^{[z \sigma - 0.5 \sigma^2]}$$

$$AML = LTA \times e^{[z \sigma_n - 0.5 \sigma_n^2]}$$

where:

$$\sigma^2 = \ln[CV^2 + 1]$$

$$z = 2.326 \text{ (99th percentile)}$$

$$LTA = \text{Limiting long term average}$$

where:

$$\sigma_n^2 = \ln[(CV^2 - n) + 1]$$

$$z = 1.645 \text{ (95th percentile)}$$

$$n = \text{numbers of samples/month}$$

$$LTA = \text{Limiting long term average}$$

The first three spreadsheets that follow illustrate the affects of extreme effluent temperature and pH at the edge of the chronic mixing zone.

Calculation of pH of a mixture of two flows. Based on the
procedure in EPA's DESCON program (EPA, 1988. Technical
Guidance on Supplementary Stream Design Conditions for Steady
State Modeling. USEPA Office of Water, Washington D.C.)

Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93

INPUT

1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	467.000
1. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	20.50
pH:	8.00
Alkalinity (mg CaCO3/L):	55.00
2. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	35.10
pH:	9.80
Alkalinity (mg CaCO3/L):	270.00

OUTPUT

1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.38
Effluent pKa:	6.30
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.98
Effluent Ionization Fraction:	1.00
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	56.31
Effluent Total Inorganic Carbon (mg CaCO3/L):	270.09
4. CONDITIONS AT MIXING ZONE BOUNDARY	
Temperature (deg C):	20.53
Alkalinity (mg CaCO3/L):	55.46
Total Inorganic Carbon (mg CaCO3/L):	56.77
pKa:	6.38
pH at Mixing Zone Boundary:	8.00

Calculation of pH of a mixture of two flows. Based on the
procedure in EPA's DESCON program (EPA, 1988. Technical
Guidance on Supplementary Stream Design Conditions for Steady
State Modeling. USEPA Office of Water, Washington D.C.)

Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93

INPUT

1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	467.000
1. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	12.00
pH:	8.00
Alkalinity (mg CaCO3/L):	55.00
2. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	35.10
pH:	9.80
Alkalinity (mg CaCO3/L):	270.00

OUTPUT

1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.45
Effluent pKa:	6.30
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.97
Effluent Ionization Fraction:	1.00
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	56.53
Effluent Total Inorganic Carbon (mg CaCO3/L):	270.09
4. CONDITIONS AT MIXING ZONE BOUNDARY	
Temperature (deg C):	12.05
Alkalinity (mg CaCO3/L):	55.46
Total Inorganic Carbon (mg CaCO3/L):	56.99
pKa:	6.45
pH at Mixing Zone Boundary:	8.00

Calculation of pH of a mixture of two flows. Based on the
procedure in EPA's DESCON program (EPA, 1988. Technical
Guidance on Supplementary Stream Design Conditions for Steady
State Modeling. USEPA Office of Water, Washington D.C.)

Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93

INPUT

1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	467.000
1. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	12.00
pH:	8.00
Alkalinity (mg CaCO3/L):	55.00
2. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	35.10
pH:	5.80
Alkalinity (mg CaCO3/L):	270.00

OUTPUT

1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.45
Effluent pKa:	6.30
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.97
Effluent Ionization Fraction:	0.24
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	56.53
Effluent Total Inorganic Carbon (mg CaCO3/L):	1131.04
4. CONDITIONS AT MIXING ZONE BOUNDARY	
Temperature (deg C):	12.05
Alkalinity (mg CaCO3/L):	55.46
Total Inorganic Carbon (mg CaCO3/L):	58.84
pKa:	6.45
pH at Mixing Zone Boundary:	7.66

This spreadsheet shows the calculation of hardness-dependent water quality criteria for the receiving water at the outfall.
A hardness of 58 mg/L (as CaCO₃) is assumed.

SPREADSHEET CREATED BY D. NUNNALLEE, REV. 1-92 BY G. SHERVEY								
Last revision date 7/99		FILENAME:						
FACILITY:		RUN DATE:	12/8/99					
		PREPARED BY:						
WATER QUALITY CRITERIA (in ug/L unless otherwise noted)								
	PRIOR	CAR	Water Quality Criteria		Metals Translators			
	ITY	CIN	Fresh		Source and		Freshwater	
Pollutant, CAS No. & Application Ref. No.	PLTNT?	GEN?	acute	chronic	Comments		Acute	Chronic
ALUMINUM, total recoverable 7429905	N	N	750	87	EPA 440/5-86-008			
CHROMIUM(TRI) -16065831 5M Hardness dependent	N	N	336.30	109.09	WAC 173-201A, EXCEPT MARINE ACUTE			
COPPER - 744058 6M Hardness dependent	Y	N	9.69	6.81	WAC 173-201A		0.996	0.996
ZINC- 7440666 13M hardness dependent	Y	N	68.96	62.97	WAC 173-201A,		0.996	0.996

WATER QUALITY-BASED PERMIT LIMIT CALCULATIONS

Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.																					
					Permit Limit Calculation Summary					Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations							Statistical variables for permit limit calculation				
	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translator	Metal Criteria Translator	Ambient Concentration	Water Quality Standard Acute	Water Quality Standard Chronic	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)	WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	LTA Coeff. Var. (CV)	LTA Probly Basis	Limiting LTA	Coeff. Var. (CV)	AML Probly Basis	MDL Probly Basis	# of Samples per Month	
PARAMETER			Acute	Chronic	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	decimal	decimal	ug/L	decimal	decimal	decimal	n	
Aluminum	467.0	1479.00			6.0000	750.0000	87.0000	134904.1	196800.0	347454	119805.00	111561.6	63189.2	0.60	0.99	63189.2	0.60	0.95	0.99	1.00	1.00
Chromium	467.0	1479.00	1.00	1.00	1.0000	336.3000	109.0900	107338.0	156686.1	156686	159866.11	50277.2	84318.7	0.60	0.99	50277.2	0.60	0.95	0.99	1.00	1.00
Copper	467.0	1479.00	1.00	1.00	1.1000	13.0400	8.9200	3838.4	5599.5	5577	11566.88	1790.7	6100.8	0.60	0.99	1790.7	0.60	0.95	0.99	1.00	1.00
Zinc	467.0	1479.00	1.00	1.00	1.30	90.10	82.27	28349.6	41356.7	41191	118869.13	13225.8	62695.6	0.60	0.99	13225.8	0.60	0.95	0.99	1.00	1.00

REASONABLE POTENTIAL CALCULATION

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)									CALCULATIONS								
				State Water Quality Standard		Max concentration at edge of...											
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation	s	# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	Acute	Chronic	ug/L	ug/L	ug/L	ug/L	ug/L			Pn	ug/L	CV	s	n			
Aluminum			6.0000	750.0000	87.0000	7.20	6.38	NO	0.95	0.779	348.00	0.60	0.55	12	1.63	467	1479
Chromium	1.00	1.00	1.0000	336.3000	109.0900	1.03	1.01	NO	0.95	0.779	10.00	0.60	0.55	12	1.63	467	1479
Copper	1.00	1.00	1.1000	13.0400	8.9200	1.44	1.21	NO	0.95	0.779	100.00	0.60	0.55	12	1.63	467	1479
Zinc	1.00	1.00	1.9000	68.9600	62.9700	1.99	1.93	NO	0.95	0.779	27.40	0.60	0.55	12	1.63	467	1479

REASONABLE POTENTIAL CALCULATION FOR PROTECTION OF HUMAN HEALTH

		Water Quality Criteria for Protection of Human Health	Max concentration at edge of chronic mixing zone.										# of samples from which # in col. K was taken		Calculated 50th percentile Effluent Conc. (When n>10)	
	Ambient Concentration (Geometric Mean)			LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT	MAXIMUM DAILY EFFLUENT LIMIT	Estimated Percentile at 95% Confidence		Max effluent conc. measured	Coeff Variation			Multiplier		Dilution Factor
Parameter	ug/L	ug/L	ug/L			ug/L	ug/L		Pn	ug/L	CV	S	n			
Copper	1.10	1300.00	1.12	NO	1	NONE	NONE	0.50	0.78	100.00	0.60	0.6	12	0.65	31.60	1479.0
Zinc	1.9000	9100.00	1.92	NO	1	NONE	NONE	0.50	0.78	52.00	0.60	0.6	12	0.65	27.40	1479.0
			#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	0.50	#DIV/0!		0.60	0.6		#DIV/0!		